

Hairstreaks, Coppers and Blues from Mongolia

(Lep., Lycaenidae)

by

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Abstract

The present work contains a list of the Lycaenidae collected in Mongolia in 1986 and the description of two new taxa: *Lycaeides argyrognomon gabrieli* and *Lycaeides cleobis boreas* (subspec. n.)

A modern systematic list of the Lycaenidae hitherto known from Mongolia with some systematic corrections is presented.

Introduction

Four Hungarian lepidopterists have collected in Mongolia in the summer of 1986. From their month-long expedition they brought back about 20.000 Macrolepidoptera and almost the same quantity of Microlepidoptera. On examination of the material taken, some new taxa have already been found and described (BALINT, 1987b; RONKAY, 1987a and 1987b; RONKAY & RONKAY, 1986 & 1987; VARGA & RONKAY, 1987).

The present work consists of three parts in which the Lycaenidae material of the above mentioned expedition is studied. In the first part two new subspecies are described, the second part gives a systematic list of all hitherto known Lycaenidae from Mongolia as a revised draft of one of my earlier publications (BALINT, 1987a). The third part treats all collected hairstreaks, coppers and blues, together with a locality list.

I wish to express my gratitude to my wife ANNAMARIA KERTESZ and Mr. H. FALKENHAHN for their help in the preparation of the English manuscript, and to the collectors (GYÖRGY FABIAN, MARTON HREBLAY, LASZLO PEREGOVITS and GABOR RONKAY) for allowing me to study their material.

I am also thankful to LASZLO PEREGOVITS and ANDRAS VOJNITS for the photos of the types and to my colleagues ESZTER ACS and LASZLO RONKAY for the preparation of some genitalia slides.

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1. Taxonomical Part

1.1 *Plebeius (Lycaeides) argyrognomon gabrieli* subspec. n. (figs. 1-4)

Diagnosis

Length of forewing of Holotype ♂: 14,8 mm; Allotype ♀: 15.00 mm; extreme values on males: 14.0 and 15,1 (based on 36 ♂♂ specimens), those of females: 14,1 and 15,0 (based on 4 ♀♀ specimens).

Upperside ground colour of male clear bright blue with silvery blue scales near costal veins of forewing. End of veins black, black border narrow. Fringes white with black hairs at veins-end.

Underside ground colour light cool grey with slight suffusion of silvery green scales at the base. Velvety black basally, discoidal and postdiscal spots of wings white ringed, black v-marks gently curved towards pale and narrow orange submarginal lunules, scarcely visible arrow-head markings between postdiscal spots and submarginal band. Marginal area white with large metallic blue pupils in each cell. End of veins black. Genitalia (fig. 17) similar to other described Siberian and Central Asian taxa (FORSTER, 1936).

Upperside ground colour of female greyish brown with large suffusion of deep violet scales on forewing basal and hindwing basal and anal areas. Submarginal markings of both wings prominent. Fringes brownish white. Underside as in male, but ground colour with brownish shade and larger, more extensive markings.

Subspecific Characters. We can separate the new taxon from the related Mongolian subspecies by the paler orange submarginal lunules and the row of the antemarginal metallic pupils of the hindwing underside.

Type Locality. Mongolia, Gurvan Sayhan uul Mountain (Govi Altay), valley Yulin am.

Type Data. Holotype ♂, Allotype ♀ and 29 ♂♂ and 3 ♀♀ Paratypes with same labels: "Mongolia, Ömnögovî aimak, Govi Altay, Mts. Gurvan Sayhan uul, valley Yulin am, 2350 m, 104°03'E 43°26'N; 22.VII.1986, exp. GY. FABIAN, M. HREBLAY, L. PEREGOVITS, G. RONKAY" and 7 ♂♂ and 1 ♀ Paratypes with label "Mongolia, Ömnögovî aimak, Govi Altay, Mts. Gurvan Sayhan uul, valley Alyut am, 2400 m, 103°55'E, 43°30'N; 24.VII.1986, exp. GY. FABIAN, M. HREBLAY, L. PEREGOVITS, G. RONKAY".

Type-material deposited in the Lepidoptera collection of the Hungarian Natural History Museum, Budapest.

Note. The Gurvan Sayhan uul Mountain is very interesting from a lepidopterologic point of view. It is isolated by deserts and semideserts and, consequently, whilst studying the material from there, it became evident, that a lot of new species and subspecies were discovered and had to be described.

Etymology. I dedicate the new subspecies to my boyhood-friend GABOR (GABRIEL) RONKAY, who participated in the Mongolian expedition and has collected several type specimens.

Examined Material (*Lycaeides argyrognomon mongolica* GR. GR)

Bulgan aimak: 25 ♂♂ and 8 ♀♀; Chösvsgöl aimak: 6 ♂♂ and 4 ♀♀; Uburchangaj aimak: 4 ♂♂ and 1 ♀; Archangaj aimak: 2 ♂♂ and 1 ♀; Central (Töv) aimak: 60 ♂♂ and 24 ♀♀; Övörhangaj aimak: 1 ♂ and 1 ♀; Dundgovi aimak: 2 ♂♂ and 1 ♀; Chentej aimak: 8 ♂♂ and 2 ♀♀; Cojbolsan aimak: 8 ♂♂ and 2 ♀♀; Sucheabaator aimak: 26 ♂♂ and 8 ♀♀ (collection of the Hungarian Natural History Museum, Budapest).

1.2 *Plebeius* (*Lycaeides*) *cleobis boreas* subspec. n. (figs. 5-8)

Diagnosis

Length of forewing of Holotype ♂: 13,5 mm; Allotype ♀: 13,3 mm; Paratype ♂: 13,0 mm; Paratypes 3 ♀♀: 13,0 (2 specimens) and 13,3 mm.

Upperside ground colour of male greyish brown with scattered blue scales at wing-base and along forewing-costa. Fringes chalk white with brownish hairs at veins-end. Underside ground colour silvery green with brownish shade on forewing. Discoidal and postdiscal spots blackish, large and ringed with dirty-white colour. Submarginal orange lunules pale and vestigial, v-marks small, antemarginal spots suffused on forewing. Forewing marginal part dirty grey. Hindwing ground colour somewhat paler, basal area finely suffused with silvery blue scales. Basal, discoidal and postdiscal spots velvety black, rings whitish. Scarcely visible white arrow-head markings between postdiscal spots and submarginal lunules. Submarginal band narrow, pale orange coloured with small roundish cap-spots. Each antemarginal spot with large blue metallic pupil. Marginal part of hindwing dirty grey. Genitalia (figs. 18) similar to other described Siberian and Central Asian taxa (FORSTER, 1936).

Female as male, but upperside ground colour browner and with suffused submarginal markings. Underside ground colour brown, all markings larger and much more extensive.

Subspecific characters. The new subspecies is smaller than ssp. *ida* GR. GR. and has a browner underside and upperside ground colour in both sexes. The submarginal markings of the female upperside are also pale and vestigial. The metallic pupils of the antemarginal part of hindwing are larger as in ssp. *ida* GR. GR.

Type Locality. Mongolia, Gurvan Sayhan uul Mountain (Govi Altay), valley Yulin am.

Type Data. Holotype ♂, Allotype ♀ and Paratypes (1 ♂ and 3 ♀♀) with same labels: "Mongolia, Ömnögovi aimak, Govi Altay, Mts. Gurvan Sayhan uul, valley Yulin am 2350 m, 104°03'E 43°26'N; 22.VII.1986, exp. GY. FABIAN, M. HREBLAY,

L. PEREGOVITS, G. RONKAY“.

Type-material deposited in the Lepidoptera collection of the Hungarian Natural History Museum, Budapest.

Etymology. Boreas the name of the Northern wind in the Greek mythology; referring to the stormy Siberian winds.

Examined Material (*Lycaeides cleobis ida* GR. GR)

Bulgan aimak: 1 ♂; Chösvsgöl aimak: 4 ♂♂ and 1 ♀; Uburchangaj aimak: 32 ♂♂ and 1 ♀; Archangaj aimak: 6 ♂♂ and 4 ♀♀; Central (Töv) aimak: 43 ♂♂ and 26 ♀♀; Zavchan aimak: 11 ♂♂ and 2 ♀♀; Govi Altaj aimak: 1 ♂ and 1 ♀; Uvs aimak: 2 ♂♂ and 2 ♀♀ (collection of the Hungarian Natural History Museum, Budapest).

2. Revised Systematic List of Mongolian Lycaenidae

Subfamily Theclinae SWAINSON, 1831

Tribe Theclini SWAINSON, 1831

genus *Thecla* FABR., 1807

betulae crassa LEECH, 1894

Tribe Aphnaeini SWINHOE, 1912

genus *Apharitis* RILEY, 1925

epargyros EN., 1854

Tribe Eumaeini DOUBLEDAY, 1847

genus *Neolycaena* DE NICEVILLE, 1890

subgenus *Neolycaena* DE NICEVILLE, 1890

davidi OBTH., 1881

subgenus *Rhymnaria* ZHDANKO, 1983

rhymnus EV., 1832

genus *Strymonidia* TUTT, 1908

rubicundula LEECH, 1855

prunoides STAUD., 1887

eximius FIXS., 1887

genus *Callophrys* BILLBERG, 1820

subgenus *Callophrys* BILLBERG, 1820

rubi sibirica HEYNE, 1895

subgenus *Ginzia* OKAHO, 1907

frivaldszkyi LED., 1855

Subfamily Lycaeninae LEECH, 1815

genus *Lycaena* FABR., 1807

phlaeas hyperborea FORD, 1923

helle phintonis FRUHST., 1910

splendens violacea STGR., 1892

dispar aurata LEECH, 1816

- genus *Heodes* DALMAN, 1816
 - subgenus *Heodes* DALMAN, 1816
 - virgaureae virgaureola* STGR., 1892
 - subgenus *Loweia* TUTT, 1906
 - alciphron* ROTT., 1775 (ssp.?)
 - subgenus *Palaeochrysophanus* VERITY, 1943
 - hippotoe* L., 1761 (ssp.?)
 - subgenus *Phoenicurusia* VERITY, 1943
 - phoenicura dimorpha* STGR., 1892

Subfamily Polyommatae SWAINSON, 1827

Tribe Everini TUTT, 1908

- genus *Everes* HÜBNER, 1819
 - subgenus *Everes* HÜBNER, 1819
 - argades hellotia* MEN., 1857
 - proseua duplex* ALPH., 1889
 - subgenus *Tongeia* TUTT, 1908
 - fischeri* EV., 1843
- genus *Cupido* SCHRANK, 1801
 - minus magnus* STGR., 1892

Tribe Celastrini TUTT, 1908

- genus *Celastrina* TUTT, 1906
 - argiolus* L., 1758

Tribe Scolitantidini TUTT, 1909

- genus *Philotes* SCUDDER, 1876
 - subgenus *Pseudophilotes* BEURET, 1955
 - baton* BERGSTR., 1779 (ssp.?)
- genus *Scolitantides* HÜBNER
 - orion* PALL., 1771 (ssp.?)
- genus *Glaucopsyche* SCUDDER, 1872
 - subgenus *Glaucopsyche* SCUDDER, 1872
 - lycormas lederi* A. BANG-HAAS, 1907
 - subgenus *Maculinea* VAN ECKE, 1915 stat. n.
 - alcon* D. & S., 1775 (ssp.?)
 - arion cyanecula* EV., 1848
 - teleius obscurata* STGR., 1892

Tribe Polyommataini SWAINSON, 1827

- genus *Plebeius* KLUK, 1802
 - subgenus *Plebeius* KLUK, 1802
 - argus obensis* FORST., 1936
 - subgenus *Lycaeides* HÜBNER
 - idas ongodai* TUTT, 1908
 - argyrognomon mongolica* GR. GR., 1891

- argyrognomon gabrieli* BALINT, 1988 subspec. n.
cleobis ida GR. GR., 1891
cleobis boreas BALINT, 1988 subspec. n.
- genus *Polyommatus* LATREILLE, 1804
 subgenus *Agriades* HÜBNER
aquilo vosnesenskyi MEN., 1857
 subgenus *Albulina* TUTT, 1909
orbitulus sajana RÜHL & HEYNE, 1895
lucifera STGR., 1892
 subgenus *Vacciniina* TUTT, 1909
optilete sibirica STGR., 1892
 subgenus *Polyommatus* LATREILLE, 1804
thersites orientis SHELJ., 1928
icarus fuchsi SHELJ., 1928
erotides STGR., 1892
aloisi BALINT, 1988
cyane kozhantshikovi SHELJ., 1928
 subgenus *Agrodiaetus* HÜBNER, 1822
damon mongolicus KUR., 1970
damone sibiricus STGR., 1892
amandus SCHN., 1872 (ssp.?)
 subgenus *Cyaniris* DALMAN, 1816
semiargus altaicus TUTT, 1909
 subgenus *Eumedonia* FORSTER, 1938
eumedon sarykola SHELJ., 1914
- genus *Aricia* R.L., 1817 rev. stat.
 subgenus *Pseudaricia* BEURET, 1958
nicias borsippa FRUHST., 1915
 subgenus *Aricia* R.L., 1817
allous strandi OBR.
chinensis sibiricana KOZH., 1923

Notes

I have already published a systematic list of Mongolian Lycaenidae (BALINT, 1987a). In that work I was following the system of ELIOT (ELIOT, 1973), being unaware at that time of the system of ZHDANKO (ZHDANKO, 1983) which was used also by NEKRUTENKO(1985).

The system of the work of ZHDANKO (l.c.) disagrees notably from that of ELIOT (l.c.) and HIGGINS (HIGGINS, 1975): most of the genera are downgraded as subgenera.

The present systematic list of the Mongolian Lycaenidae butterflies follows the work of ZHDANKO, but differs from it in the following points, based on my own studies:

Maculinea, a subgenus of *Glaucopsyche*

The species of the taxon *Glaucopsyche* SCUDDER, 1872 do not differ essentially from the species of the taxon *Maculinea* VAN EECKE, 1915 in the structure of the male genitalia and in the morphology of the butterflies; the shape of valva is wide and oblong with a long and straight apical hook. Furca is strong, conspicuous and relatively medium sized. The shape of labides is obtused, falces strong and curved inwards, penis with elaborated apical structure and with two sacculi on the other end (Fig. 19), [and see (RUBIO, 1976: tables 29-24)].

The submarginal and marginal markings of the underside of the butterflies are strongly reduced, the orange submarginal band is always missing.

Aricia, a genus distinct from *Polyommatus*

The species of the taxon *Aricia* R.L., 1817 have so extreme characteristic genitalic characters, that we can not treat them as congeneric with *Polyommatus* SWAINSON, 1827: labides expanded and narrow, falces very small, shape of valva wide and somewhat triangular with a prominent strong apical hook, penis gently curved with zonal rib, against the species of *Polyommatus* with always horseshoe-like labides, having medium-sized falces, narrow and elongate valva with a prominent lobe on the inner top. The shape of penis is much more simple (RUBIO 1976: tables 43-47 and 52-71).

I must note here that the systematic position of the following species and subgenera are not yet clear:

subgenera *Agriades* HBN. and *Albulina* TUTT (figs. 9-12)

According to ZHADNKO (l.c.) I have retained the mentioned taxa as subgenera of the genus *Polyommatus* SW., but they differ in some significant genitalic and morphologic features. Perhaps they create a distinct genus, or else it would be better to group them with *Plebeius* KLUK.

Albulina lucifera STGR.

The species creates together with the *eversmanni*-Complex (FORSTER 1940) an undescribed subgenus.

Polyommatus cyane EV. (figs. 13-16)

A Central Asian species, distributed from Southern Ural through Turkestan and Alai Mountains to Mongolia, which does not fit into any of the described subgenera of *Polyommatus* SW.

3. Collected Material

3.1 Collecting Places and Data (fig. 20)

TR "Mongolia, Central aimak, 12 km NW of Ulaanbaatar, flood area of Tola river, 1300 m, 106°43'E 47°53'N"

collecting days: 5.VII., 10.VII.

River flats with willow bushes, higher up changing into steppe, covered with high grass. The lycaenids were collected at twilight from the tops of grasses with the help of a torch.

BA "Mongolia, Central aimak, Bogdo-uul Mts., 5 km S of Ulaanbaatar Airport, 1650 m, 106°52'E 47°50'N"

collecting days: 6.VII., 7.VII., 11.VII., 13.VII., 16.VII., 1.VIII.

Collections on subalpine pastures at evening with torch and at daytime.

AP "Mongolia, Central aimak, 2 km S of Ulaanbaatar Airport, 1350 m, 106°47'E 47°51'N"

Eroded pastures covered by *Artemisia*. The butterflies were collected in the evening and at night with the help of a torch while resting on grass.

APT "Mongolia, Central aimak, 5 km W of Ulaanbaatar Airport, 1400 m, 106°43'E 47°52'N"

collecting days: 8.VII., 15.VII., 2.VIII.

The collecting places and methods were similar to the preceding one (AP).

BT "Mongolia, Central aimak, Bogdo-uul Mts., Baga tenger valley, 8 km SE of Ulaanbaatar Airport, 1700 m, 106°57'E 47°50'N"

collecting day: 9.VII.

Somewhat higher in altitude compared to BA, where many blueberry bushes and birches were growing. The lycaenids were captured at night with the help of a torch.

BTU "Mongolia, Central aimak, Bogdo-uul Mts., Baga tenger valley, 8 km SE of Ulaanbaatar Airport, 1400-2000 m, 106°57'E 47°48'N"

collecting days: 9.VII., 17.VII.

The highest collecting point in the Bogdo-uul Mountains, where *Aconitum* species can already be seen. Collecting at day-time.

S "Mongolia, Central aimak, 100 km S of Ulaanbaatar, 106°36'E 47°05'N"

collecting day: 19.VII.

Artemisia-steppe. Collecting at day-time.

MG "Mongolia, Dundgovi aimak, 4 km NE of Mandalgovi, 106°20'E 45°48'N" (fig. 21)

collecting day: 20.VII.

Semidesert, covered with scattered tufts of grass where the lycaenids were collected from at day-time.

DZ "Mongolia, Ömnögovi aimak, 85 km N of Dalandzadgad, 105°08'E 44°10'N" (fig. 22)

collecting day: 21.VII.

Strongly eroded pastures deposited on the edge of the town. Collecting at day-time.

YA "Mongolia, Ömnögovi aimak, Govi Altay, Mts. Gurvan Sayhan uul, valley Yulin am, 2350 m, 104°03'E 43°36'N" (fig. 23)

collecting day: 22.VII.

Alpine grass-slopes and rocky swards. Collecting at day-time.

AM "Mongolia, Ömnögovi aimak, Govi Altay, Mts. Gurvan Sayhan uul, valley Alyut am, 2400 m, 103°55'E 43°30'N" (fig. 24)

collecting day: 23.VII.

The biotopes are similar to Yulin. The lycaenids were captured during a short day-time trip.

AH "Mongolia, Övörhangay aimak, 40 km SE of Arvayheer, 103°08'E 46°00'N" collecting day: 25.VII.

Semidesert with a drift where the vegetation was luxuriant. The lycaenids were found at day-time.

HN "Mongolia, Övörhangay aimak, Mts. Hangayn nuruu, 2150 m, Harhorin, 102°49'E 40°12'N" (figs. 25-26).

collecting days: 28.VII., 29.VII., 30.VII.

Alpine meadows with rich vegetation. The butterflies were collected mostly at day-time.

3.2 List of Collected *Lycaenidae*

Thecla betulae crassa LEECH: 4 ♂♂ HN.

Neolycaena davidi OBTH.: 5 ♂♂ and 3 ♀♀ S; 17 ♂♂ and 5 ♀♀ DZ.

Strymonidia rubicundula LEECH: 1 ♂ and 2 ♀♀ HN.

Lycaena splendens violacea STGR.: 3 ♂♂ BA; 1 ♂ BTU; 1 ♀ APT; 4 ♀♀ S; 1 ♂ MG; 1 ♂ HN.

Heodes virgaureae virgaureola STGR.: 2 ♂♂ BA; 5 ♂♂ and 1 ♀ BTU; 2 ♂♂ and 5 ♀♀ HN.

Everes argiades helotia MEN.: 1 ♀ HN.

Everes (Tongeia) fischeri RV.: 1 ♀ APT.

Glaucopsyche lycormas lederi A. BANG-HAAS: 1 ♂ TR.

Glaucopsyche (Maculinea) arion cyanecula EV.: 31 ♂♂ and 20 ♀♀ BA; 11 ♂♂ and 1 ♀ APR; 2 ♂♂ and 1 ♀ TR; 4 ♂♂ S; 6 ♂♂ MG; 8 ♂♂ and 6 ♀♀ HN.

Plebeius (Lycaeides) argyrognomon mongolica GR. GR.: 86 ♂♂ and 45 ♀♀ TR; 5 ♂♂ BTU; 9 ♂♂ and 3 ♀♀ APT; 3 ♂♂ and 2 ♀♀ S; 6 ♂♂ and 1 ♀ MG; 1 ♂ AH; 7 ♂♂ and 1 ♀ HN.

Plebeius (Lycaeides) argyrognomon gabrieli BAL.: 30 ♂♂ and 4 ♀♀ YA; 7 ♂♂ and 1 ♀ AM.

Plebeius (Lycaeides) cleobis ida GR. GR.: 22 ♂♂ and 36 ♀♀ BA; 23 ♂♂ and 10 ♀♀ TR.; 4 ♂♂ and 1 ♀ BT; 1 ♂ BTU; 2 ♂♂ and 1 ♂ APT; 1 ♀ S; 1 ♀ MG; 5 ♂♂ and 4 ♀♀ HN.

Plebeius (Lycaeides) cleobis boreas BAL.: 2 ♂♂ and 4 ♀♀ YA.

Polyommatus (Agriades) aquilo wosnesenskyi MEN.: 2 ♂♂ BA; 1 ♂ TR; 6 ♂♂ and 4 ♀♀ BT; 1 ♀ BTU.

Polyommatus (Albulina) orbitulus sajana RÜHL & HEYNE: 9 ♂♂ and 6 ♀♀ BA; 3 ♂♂ and 1 ♀; 4 ♂♂ BTU.

Polyommatus (Albulina) lucifera STGR.: 1 ♂ and 1 ♀ BTU; 5 ♂♂ and 9 ♀♀ YA; 4 ♂♂ AM; 4 ♀♀ HN.

Polyommatus thersites orientis SHELJ.: 1 ♂ and 1 ♀ HN.

Polyommatus icarus fuchsi SHELJ.: 1 ♀ TR.

Polyommatus erotides STGR.: 5 ♂♂ BA; 1 ♂ TR; 13 ♂♂ and 1 ♀ AP; 3 ♂♂ APT; 2 ♂♂ BTU; 1 ♀ S; 1 ♂ AM; 30 ♂♂ and 9 ♀♀ HN.

Polyommatus aloisi BAL.: 3 ♂♂ YA; 1 ♂ AM.

Polyommatus cyane kozhantshikovi SHELJ.: 1 ♀ BA; 3 ♂♂ and 3 ♀♀ S; 1 ♂ MG.

Polyommatus (Agrodiaetus) damon mongolicus KUR.: 77 ♂♂ and 106 ♀♀ HN.

Polyommatus (Agrodiaetus) damone sibiricus STGR.: 2 ♂♂ MG; 2 ♂♂ and 1 ♀ HN.

Fig. 17 ~ *Plebeius (Lycaeides) argyrognomon gabrieli* subspec. n., male genitalia, Paratype, gen. prep. No. 101. BALINT

Fig. 18 *Plebeius (Lycaeides) cleobis boreas* subspec. n., male genitalia, Paratype, gen. prep. No. 104. BALINT

Fig. 19 *Glaucopteryx (Maculinea) arion cyaneola* EV. from Mongolia, male genitalia, gen. prep. No. 103. BALINT

Fig. 20 The collecting places of the Hungarian lepidopterologic expedition in Mongolia in 1986:

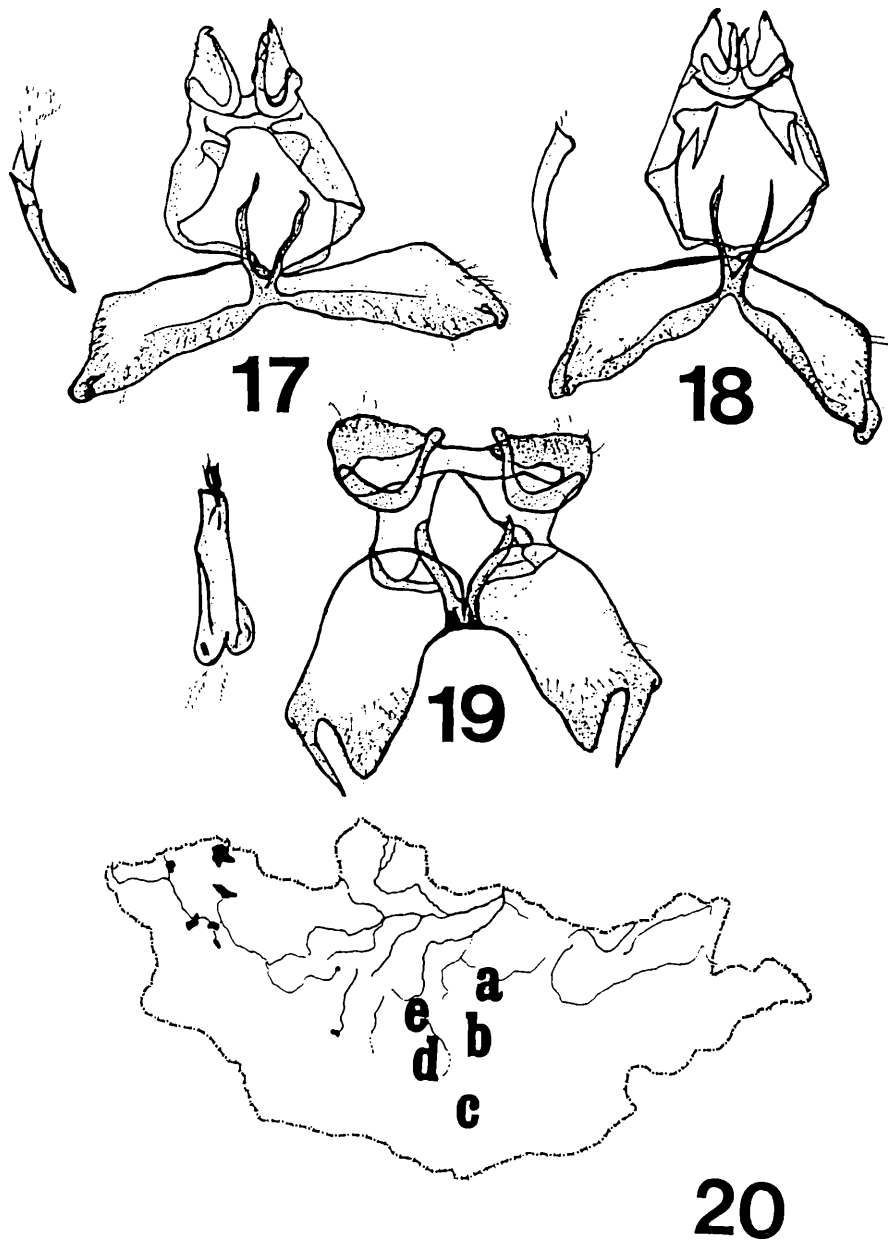
a - Surroundings of Ulaanbaatar (TR, BA, AP, APT, BT, BTU);

b - Central Mongolia (S, MG, DZ);

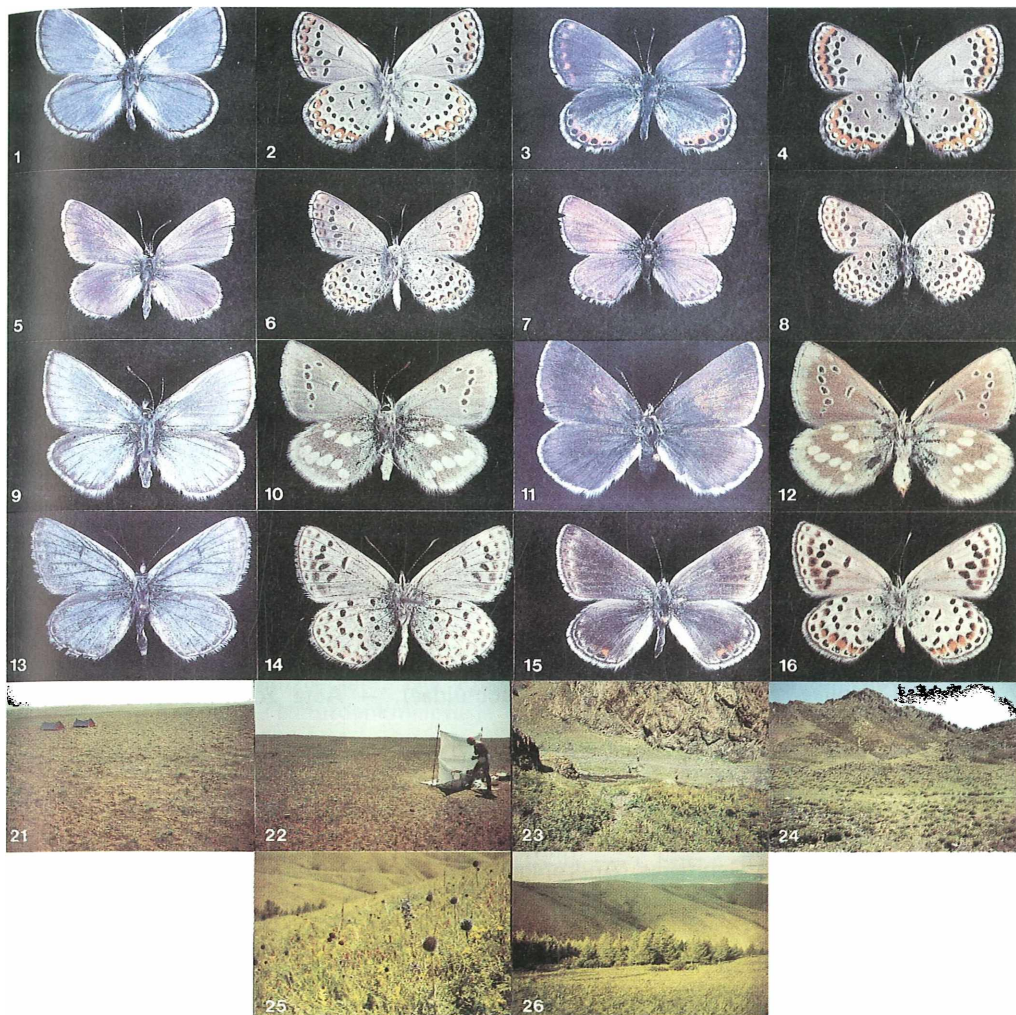
c - Gobi Altay (YA, AM);

d - Surroundings of Arvayheer (AH);

e - Hangayn nuruu Mountains.



- Fig. 1 *Plebeius (Lycaeides) argyrognomon gabrieli* subsp. n. Holotype ♂, upperside
- Fig. 2 idem, underside
- Fig. 3 *Plebeius (Lycaeides) argyrognomon gabrieli* subsp. n. Allotype ♀, upperside
- Fig. 4 idem, underside
- Fig. 5 *Plebeius (Lycaeides) cleobis boreas* subsp. n. Holotype ♂, upperside
- Fig. 6 idem, underside
- Fig. 7 *Plebeius (Lycaeides) cleobis boreas* subsp. n. Allotype ♀, upperside
- Fig. 8 idem, underside
- Fig. 9 *Polyommatus (Albulina) orbitulus sajana* R. and H. ♂ (BT), upperside
- Fig. 10 idem, underside
- Fig. 11 *Polyommatus (Albulina) orbitulus sajana* R. and H. ♀ (BA, 6.VII.), upperside
- Fig. 12 idem, underside
- Fig. 13 *Polyommatus cyane kozhantshikovi* SHELJ. ♂ (S), upperside
- Fig. 14 idem, underside
- Fig. 15 *Polyommatus cyane kozhantshikovi* SHELJ. ♀ (BA, 13.VII.), upperside
- Fig. 16 idem, underside
-
- Fig. 21 Semidesert in the surroundings of Mandalgovi (MG). Biotope of *Neolycaena davidi*, *Lycaena splendens*, *Glaucopsyche arion cyanecula*, *Plebeius argyrognomon mongolica*, *Plebeius cleobis ida*, *Polyommatus cyane kozhantshikovi*, *Polyommatus damone sibiricus*.
- Fig. 22 Dalandzadgad, strongly eroded pastures (DZ). Biotope of *Neolycaena davidi*.
- Fig. 23 The valley Yulin am in the Govi Altay (YA). Biotope of *Plebeius argyrognomon gabrieli*, *Plebeius cleobis boreas*, *Polyommatus lucifera*, *Polyommatus aloisi*.
- Fig. 24 The upper entrance of the valley Alyut am, in the Govi Mountains Altay (AM). Biotope of *Plebeius argyrognomon gabrieli*, *Polyommatus lucifera*, *Polyommatus erotides*, *Polyommatus aloisi*.
- Figs. 25-26 Surroundings of Harhorin (HN). Biotope of *Thecla betulae crassa*, *Strymonidia rubicundula*, *Lycaena splendens violacea*, *Heodes virgaureae virgaureola*, *Everes argiades hellotia*, *Glaucopsyche arion cyanecula*, *Plebeius cleobis ida*, *Polyommatus lucifera*, *Polyommatus thersites orientis*, *Polyommatus erotides*, *Polyommatus damon mongolicus*, *Polyommatus damon sibiricus*.



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